

IN THE CLAIMS:

This listing of claims replaces all prior versions, and listings, of claims of this application:

Listing of Claims:

1. (Currently Amended) A device for voice activity detection, comprising:
a sound signal analyser configured to determine whether a sound signal comprises speech, comprising:
a microphone system configured to discriminate sounds emanating from sources located in different directions from the microphone system, wherein the ~~device~~ microphone system is configured to determine the direction of a sound source causing a sound signals signal, and is configured to further analyse the sound signal to determine whether the sound signal comprises speech, if when the sound signal emanates from a first range of directions, and is configured but to decide determine that the sound signal does not comprise speech and perform no frequency spectral processing of the sound signal when, if the sound signal emanates from a second, different range of directions;
wherein the first range of directions is directed in a direction of an intended user's mouth.
2. (Canceled)
3. (Currently amended) A device according to claim 2, wherein the microphone system comprises two microphone elements separated a distance and located on a line directed in the direction of an intended user's mouth.
4. (Previously presented) A device according to claim 3, wherein the first range of directions is defined as an area falling inside a cone with a cone angle α , wherein $10^\circ < \alpha < 30^\circ$.

5. (Previously presented) A device according to claim 4, wherein α is approximately 25° .

6. (Currently amended) A device according to claim 2 1, wherein the microphone system comprises three microphone elements separated a distance and located in a plane directed in the direction of an intended user's mouth.

7. (Previously presented) A device according to claim 6, wherein two of said three microphone elements are separated a distance and located on a line directed perpendicular to the direction of an intended user's mouth.

8. (Currently amended) A device according to claim 2 1, wherein the microphone system comprises four microphone elements, located such that the fourth microphone is not located in the same plane as the three others.

9. (Previously presented) A device according to claim 3, wherein the microphone elements are directional with a pattern having maximal sensitivity in the direction of an intended user's mouth.

10. (Previously presented) A device according to claim 1, wherein the microphone system comprises one directional microphone element together with one or more other microphone elements configured to remove the uncertainty in the direction of the sound source.

11. (Previously presented) A device according to claim 10, wherein the directional microphone element is configured to measure a sound pressure level relative to the other microphone elements.

12. (Previously presented) A device according to claim 10, wherein the device is a mobile apparatus.

13. (Previously presented) A mobile apparatus according to claim 12, wherein the microphone elements are located at a lower edge of the apparatus.

14. (Previously presented) A mobile apparatus according to claim 12, wherein a plurality of microphone elements are located at the lower edge of the apparatus and at least one microphone element is located at a distance from the lower edge.

15. (Previously presented) A mobile apparatus according to claim 12, wherein the mobile apparatus comprises a mobile radio terminal, a pager, a communicator, an electric organiser and/or a smartphone.

16. (Currently amended) An accessory for a mobile apparatus, comprising:
a microphone system configured to discriminate sounds emanating from sources located in different directions from the microphone system, wherein the microphone system is configured to determine the direction of a sound source causing sound a sound signals, and is configured to further analyse the sound signal to determine whether the sound signal comprises speech, if when the sound signal emanates from a first range of directions, and is configured but to decide determine that the sound signal does not comprise speech and perform no frequency spectral processing of the sound signal when, if the sound signal emanates from a second, different range of directions;

wherein the direction of the first range of directions is adjustable.

17. (Canceled)

18. (Previously presented) An accessory according to claim 16, wherein the accessory is a hands-free kit.

19. (Previously presented) An accessory according to claim 16, wherein the accessory is a telephone conference microphone.

20. (Currently amended) A method for voice activity detection, comprising performing operations as follows such that at least a portion of at least one of the operations is performed on at least one processor:

receiving sound signals from a microphone system configured to discriminate sounds emanating from sources located in different directions from the microphone system;

determining the direction of the sound source causing the sound signals;

analyzing the sound signals to determine whether the sound signals comprise speech when if the sound signals emanate from a first range of directions;

determining that the sound signals do not comprise speech and performing no frequency spectral processing of the sound signals when if the sound signals emanate from a second, different range of directions;

wherein the first range of directions is directed in the direction of an intended user's mouth.

21. (Canceled)

22. (Currently amended) A method according to claims 21 20, wherein the first range of directions is defined as an area falling inside a cone with a cone angle α , wherein $10^\circ < \alpha < 30^\circ$.

23. (Previously presented) A method according to claims 22, wherein α is approximately 25° .

24. (Previously presented) A method according to claim 22, wherein the microphone system comprises at least two microphone elements located at a distance d from

each other and located on a line directed in the direction of an intended user's mouth, wherein the direction to the sound source θ is calculated as

$$\theta = \arccos \frac{\Delta t \cdot v}{2 \cdot d}$$

where

Δt is a time difference between the sounds from the two microphone elements,
 v is a velocity of sound.

25. (Previously presented) A method according to claim 20, further comprising:
using one directional microphone element together with one or more other
microphone elements to reduce uncertainty in the direction of the sound source.

26. (Previously presented) A method according to claim 25, further comprising:
using the directional microphone element to measure a sound pressure level relative to
the other microphone element.